CLAIMS

What is claimed is:

1. An integrated circuit (IC) comprising:

interface circuitry to interface the IC to a burn-in system, the interface circuitry to receive at least one temperature value from the burn-in system and to send at least one temperature indication to the burn-in system;

a storage circuit coupled to the interface circuitry to store the at least one temperature value; and

a thermal sense circuit coupled to the interface circuitry to provide the at least one temperature indication.

2. The IC recited in claim 1, wherein the at least one temperature value is a set-point.

3. The IC recited in claim 1, wherein the at least one temperature indication is proportional to the junction temperature of the IC.

4. An integrated circuit (IC) burn-in system comprising:

a computer system comprising a processor operating under the control of a computer program; and

at least one IC comprising:

interface circuitry to interface the IC to the computer system; and

a thermal sense circuit, coupled to the interface circuitry, to provide a temperature indication that is proportional to the junction temperature of the IC.

5. The IC burn-in system recited in claim 4, wherein the computer system compares the temperature indication with a temperature value determined by the computer program;

wherein if the temperature indication substantially matches the temperature value, the computer system bins the IC at that temperature value; and

wherein if the temperature indication is less than the temperature value, the computer system decrements the temperature value and compares the temperature indication with the decremented temperature value.

6. The IC burn-in system recited in claim 4, wherein the IC further comprises:

logic circuitry coupled to the interface circuitry; and

wherein the logic circuitry is responsive to the temperature indication generated by the thermal sense circuit;

wherein the logic circuit is also responsive to a temperature value generated by the computer system as determined by the computer program;

wherein the logic circuitry compares the temperature indication with the temperature value;

wherein if the temperature indication substantially matches the temperature value, the logic circuitry generates a first indication to the computer system, and the computer system bins the IC at that temperature value; and

wherein if the temperature indication is less than the temperature value, the logic circuitry generates a second indication to the computer system, and the computer system decrements the temperature value and compares the temperature indication with the decremented temperature value.

7. A burn-in system for an IC comprising a thermal sense circuit, the burn-in system comprising:

a fixture to electrically couple to the IC;

a temperature-altering mechanism to alter the ambient temperature of the IC; and

a data processing system coupled to the fixture, the data processing system executing a computer program, the computer program operating the burn-in system to characterize the IC and comprising the operations of:

storing a temperature value for the IC;

controlling the temperature-altering mechanism to thermally stress the IC;

determining whether a temperature indication from the thermal sense circuit substantially matches the temperature value;

if so, recording the temperature value; and

if not, changing the temperature value to a new temperature value and determining whether the temperature indication matches the new temperature value.

8. The burn-in system recited in claim 7, wherein the computer program operating the burn-in system further comprises the operations of:

determining whether the temperature indication matches the new temperature value;

if so, recording the new temperature value;

otherwise, repeatedly changing the temperature value and comparing the temperature indication with the changed temperature value, until the temperature indication matches the changed temperature value; and

recording the changed temperature value.

9. The burn-in system recited in claim 7, wherein the temperature value is stored in a storage circuit in the IC.

10. The burn-in system recited in claim 7, wherein the temperature value is stored in a storage element in the data processing system.

11. A method of testing an integrated circuit (IC) comprising a plurality of electronic devices, one of which is to provide a temperature indication, the method comprising:

storing a temperature value for the IC;

thermally stressing the IC;

the one electronic device providing a temperature indication;

determining whether the temperature indication matches the temperature value;

if so, recording the temperature value; and

if not, changing the temperature value to a new temperature value and determining whether the temperature indication matches the new temperature value.

12. The method recited in claim 11 and further comprising;

if the temperature indication matches the new temperature value, recording the temperature value;

otherwise, repeatedly changing the temperature value and comparing the temperature indication with the changed temperature value, until the temperature indication matches the changed temperature value; and

recording the changed temperature value.

13. The method recited in claim 11, wherein storing is performed by another one of the plurality of electronic devices in the IC.

14. The method recited in claim 11, wherein storing is performed by a burn-in system coupled to the IC and comprising a stored-program digital computer.

15. The method recited in claim 11, wherein the plurality of electronic devices includes a logic circuit, and wherein determining is performed by the logic circuit.

16. The method recited in claim 11, wherein determining is performed by a burn-in system coupled to the IC and comprising a stored-program digital computer.

17. A method of testing a plurality of integrated circuits (ICs), each comprising a thermal sense circuit, the method comprising:

storing a temperature value for each IC;

thermally stressing the ICs;

each thermal sense circuit providing a temperature indication for its respective IC;

determining whether the temperature indication matches the temperature value;

if so, recording the temperature value for the corresponding IC; and

if not, changing the temperature value to a new temperature value and determining whether the temperature indication matches the new temperature value.

18. The method recited in claim 17 and further comprising;

if the temperature indication matches the new temperature value, recording the temperature value for the corresponding IC;

otherwise, repeatedly changing the temperature value and comparing the temperature indication with the changed temperature value, until the temperature indication matches the changed temperature value; and

recording the changed temperature value for the respective IC.

19. The method recited in claim 17, wherein each IC comprises a storage circuit, and wherein storing is performed by the storage circuit.

20. The method recited in claim 17, wherein storing is performed by a burn-in system coupled to the IC and comprising a stored-program digital computer.

21. The method recited in claim 17, wherein each IC comprises a logic circuit, and wherein determining is performed by the logic circuit.

22. The method recited in claim 17, wherein determining is performed by a burn-in system coupled to the IC and comprising a stored-program digital computer.

23. A method of testing a plurality of electronic components, each comprising a thermal sense circuit, the method comprising:

storing a temperature value for each electronic component;

thermally stressing the electronic components;

each thermal sense circuit providing a temperature indication for its respective electronic component;

determining whether the temperature indication matches the temperature value;

if so, recording the temperature value for the corresponding electronic component; and

if not, changing the temperature value to a new temperature value and determining whether the temperature indication matches the new temperature value.

24. The method recited in claim 23 and further comprising;

if the temperature indication matches the new temperature value, recording the temperature value for the corresponding electronic component;

otherwise, repeatedly changing the temperature value and comparing the temperature indication with the changed temperature value, until the temperature indication matches the changed temperature value; and

recording the changed temperature value for the respective electronic component.

25. The method recited in claim 23, wherein each electronic component comprises a storage circuit, and wherein storing is performed by the storage circuit.

26. The method recited in claim 23, wherein storing is performed by a burn-in system coupled to the electronic component and comprising a stored-program digital computer.

27. The method recited in claim 23, wherein each electronic component comprises a logic circuit, and wherein determining is performed by the logic circuit.

28. The method recited in claim 23, wherein determining is performed by a burn-in system coupled to the electronic component and comprising a stored-program digital computer.

29. The method recited in claim 23, wherein the electronic components are integrated circuits.

30. A computer-readable medium containing computer instructions for instructing a processor to perform a method of binning a plurality of ICs each having a thermal sense circuit, the processor forming an element in a system comprising a temperature-altering mechanism to thermally stress the ICs and a comparison mechanism, wherein the instructions comprise:

storing a temperature value for each IC;

obtaining a temperature indication from the thermal sense circuit of each IC;

for each IC not yet binned, comparing the stored temperature value with the temperature indication; and

if the temperature indication substantially matches the stored temperature value, recording the temperature value;

otherwise, changing the temperature value to a new temperature value and comparing the new temperature value with the temperature indication.

31. The computer-readable medium recited in claim 30, wherein the instructions further comprise:

if the temperature indication substantially matches the new temperature value, recording the new temperature value;

otherwise, repeatedly changing the temperature value and comparing the temperature indication with the changed temperature value, until the temperature indication substantially matches the changed temperature value, and recording the changed temperature value.

32. The computer-readable medium recited in claim 30, wherein the instructions further comprise:

determining an estimate of the burn-in time for each IC, using the particular temperature value recorded for each IC.